



Salmon, Mississippi, Site

FACT SHEET

*This fact sheet provides information about the Salmon, Mississippi, Site.
This site is managed by the U.S. Department of Energy Office of Legacy Management.*

Site Description and History

The Salmon Site, formerly called the Tatum Dome Test Site, is a 1,470-acre tract of land in Lamar County, Mississippi, 21 miles southwest of Hattiesburg. The nearest town is Purvis about 10 miles east of the site.

The site is in a forested region known as the piney woods area of the Gulf Coastal Plain. Elevations in the area range from about 240 to 350 feet above sea level. The site overlies a salt formation known as the Tatum Salt Dome. Land around the Salmon Site has residential, industrial, and commercial use, although no one lives within the boundary of the site itself.

There are oil and gas leases on the area surrounding the site. The U.S. Atomic Energy Commission, a predecessor agency of the U.S. Department of Energy (DOE), and the U.S. Department of Defense, conducted two underground nuclear tests at the site as part of the Vela Uniform program. Two gas explosive tests were also conducted at the site as part of the Miracle Play program.

The Vela Uniform program began in 1959 and was part of a Department of Defense research and development program intended to improve the capability of detecting, monitoring, and identifying underground nuclear detonations. There were seven underground nuclear tests, each given a codename, conducted in the continental U.S. and Alaska from October 1963 to July 1971. Numerous experiments using conventional high explosives were also involved in the Vela Uniform program.

Conducted under codename Project Dribble, the Salmon and Sterling tests were the second and third nuclear tests in the program. The Salmon test took place on October 22, 1964, at a depth of 2,700 feet below ground surface. This 5.3-kiloton-yield test created an underground test cavity approximately 110 feet in diameter and 2,710 feet below ground surface, which is approximately 1,200 feet below the top of the salt dome. The second, smaller test, Sterling, conducted on December 3, 1966, consisted of a 380-ton-yield nuclear device suspended in the cavity created by the Salmon test.

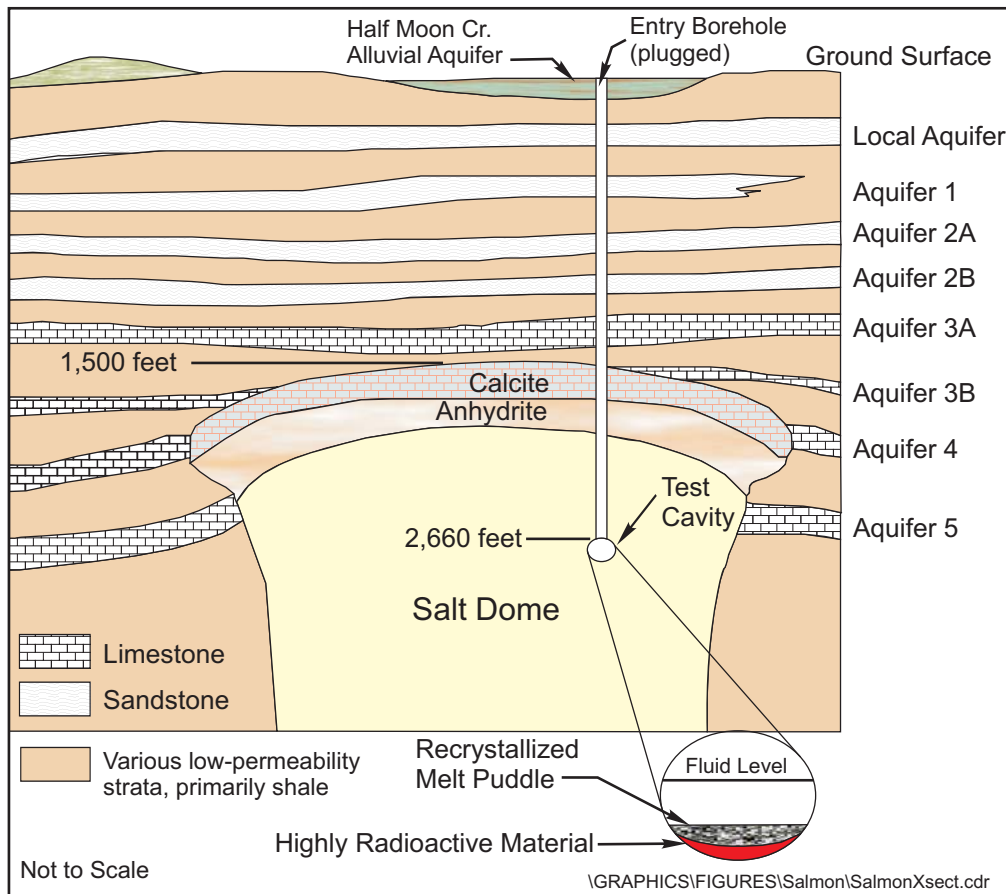
The two methane-oxygen explosions conducted in the Salmon/Sterling cavity were called the Diode



Location of Salmon, Mississippi, Site

Tube on February 2, 1969, and the Humid Water on April 19, 1970. These tests, part of the Miracle Play program, were designed to provide information on the effect of reducing or masking shock wave signals. Both tests had yields of approximately 315 tons.

All the tests were fully contained within the salt dome, and no radionuclides were released to the surface. Radioactive fission products and other materials generated during the tests are contained in the test cavity in the form of a solidified melt. However, wastes were generated at the surface from post-detonation testing activities. Following each of the tests, reentry holes were drilled into the test cavity to collect scientific data and to emplace devices. These drilling operations generated a volume of waste, which included contaminated drill cuttings and drilling fluids. In addition, support operations generated other contaminated materials. Test site support activities required fuel, electricity, sanitation, waste storage, waste disposal, and use of hazardous materials. During site operations, the Salmon Site had a work force of more than 100 people.



Cross Section of Salmon, Mississippi, Site

Site Conditions

The site cleanup and decommissioning activities began in 1972. Contaminated buildings and equipment were shipped to the Nevada Test Site for disposal; contaminated soils, slurried with fresh water, and other liquid materials were disposed of in the underground test cavity. Liquid wastes from the Salmon test reentry operations were injected into a deep brine aquifer (known as Aquifer 5) for disposal. Liquid wastes from the Sterling test reentry operations were solidified and shipped to Oak Ridge, Tennessee, for burial. Miscellaneous sanitary wastes were buried on site in shallow pits excavated for soils to replace contaminated soils. These pits were subsequently covered with clean soil and graded.

No remediation alternatives were considered for radioactive waste injected into Aquifer 5; modeling showed that the wastes would decay to levels below U.S. Environmental Protection Agency (EPA) or State of Mississippi standards in about 210 years. Aquifer 5 has a groundwater flow rate of less than 10 feet per year.

No feasible technology exists for removing the radioactivity from the deep test cavity; the assumption is that the salt formation provides sufficient geologic isolation to prevent the radioactive contamination from migrating beyond the salt dome. The crystalline salt is

nearly impermeable and has little or no capacity to transmit water.

Shortly after the creation of the DOE's Environmental Management program in 1989, concerned citizens, the State of Mississippi, and congressional leaders raised questions about the site. When DOE acquired the site in 1992, they initiated a series of studies to verify site conditions and address residual contamination. The studies were completed and released in the *Salmon Site Remedial Investigation Report*, DOE/NV-494-Vol. 1/Rev. 1., 1999. Results confirmed that decommissioning of the surface resulted in conditions protective of human health and the environment and also confirmed that no leakage of the test cavity or the deep aquifer was occurring and that wastes disposed of there were adequately contained. The human health risk assessment indicated that the only unacceptable risks would be through use of the site as a residential setting. No unacceptable risks were identified in evaluations of recreational visitor and occupational (park ranger) exposure scenarios.

Institutional Controls

A combination of institutional, engineered, and physical controls are in place to ensure protection of the public and the environment. DOE has placed a deed restriction on the land parcel indicating that no

excavation, drilling, or removal of material is permitted without prior approval from DOE. Angle drilling from outside the property boundary to within the property boundaries is also precluded.

Long-Term Hydrologic Monitoring Program

Since 1972, surface water and groundwater has been monitored annually at and near the Salmon site as part of a long-term hydrologic monitoring program. Water samples are collected for analysis of signature radionuclides from the nuclear detonations. A few groundwater samples are analyzed for organic compounds and certain metals that remain buried in pockets of residual drilling mud. The Mississippi Department of Environmental Quality and the State of Mississippi provide oversight of the sampling process.

Modeling results of the alluvial aquifer indicated that all contaminants would naturally attenuate to levels below applicable standards.

Regulatory Setting

The federal government holds title to the Salmon Site property and DOE is responsible for the radioactive and other hazardous materials generated by DOE and predecessor agencies at the site. DOE possesses the radioactive material at the Salmon Site under the authority of the Atomic Energy Act of 1954 (Title 42 *United States Code* [U.S.C.] Section 2011). The State of Mississippi

enforces numerous surface water standards developed by EPA pursuant to the Clean Water Act (33 U.S.C. 1251 et seq.) for use as state surface water standards.

Legacy Management Activities

The DOE Office of Legacy Management has responsibility for developing and implementing a site-specific Long-Term Surveillance and Maintenance Plan for the site that includes conducting annual inspections to evaluate the condition of surface features and terrestrial and aquatic ecosystems; and monitoring of groundwater and surface water to verify that concentrations of near-surface contaminants are decreasing as expected. Additional responsibilities include accepting the transfer of records and real property, managing site records, implementing and managing existing agreements and programs with regulatory agencies, and responding to stakeholder inquiries.

Contacts

Documents related to the Salmon Site are available on the DOE Office of Legacy Management website at <http://www.LM.doe.gov/land/sites/ms/salmon/salmon2.htm>.

For more information about DOE Office of Legacy Management activities at the Salmon Site, contact

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